CLAIMS:

1. A method for measuring motion of a fetus or of a region of a fetus within an uterus in a time sequence of images, each image including said fetus or region thereof and at least a portion of the uterus, the uterus comprising a lumen, the method comprising, for one or more images in the sequence:

   (a) determining a first parameter indicative of movement of the fetus or region thereof;

   (b) determining a second parameter indicative of movement of at least a portion of the uterus; and

   (c) determining whether the difference between the first parameter and second parameter exceeds a predetermined value, a difference exceeding the predetermined value being indicative of motion of the fetus or region thereof relative to motion of the at least portion of the uterus.

2. The method of Claim 1 comprising a step of marking in an image a contour of the lumen of the uterus in the image.

3. The method of Claim 2, comprising a step of tracking the contour of the lumen from image to image.

4. The method of Claim 2 or 3, comprising a step of determining movement within the contour of the lumen, said movement being identified as movement of the fetus or region thereof.

5. The method of Claim 2 or 3, comprising a step of determining movement outside the contour of the lumen, said movement being identified as movement of the uterus.

6. The method of any one of Claims 2 to 5, comprising a step of detecting in each image after a first image in the time sequence of images, clusters of pixels displaying a change in brightness in comparison to brightness of a corresponding pixel in a previous image.

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7.   The method of Claim 6, comprising a step of discarding clusters of pixels having a size not exceeding a pre-defined threshold.

8.   The method of Claim 6 or 7, comprising the step of distinctively marking clusters located within the contour of the lumen and clusters located outside the contour of the lumen.

9.   The method of any one of Claims 6 to 8, comprising the step of determining a center of gravity of clusters within the contour of the lumen and a center of gravity of clusters outside the contour of the lumen, wherein for each image, said center of gravity of clusters within the contour of the lumen and a center of gravity of clusters outside the contour of the lumen form a pair of centers of gravity.

10.   The method of Claim 9, comprising the step of tracking from image to image in said time sequence of images location of the center of gravity of clusters within the contour of the lumen and determining a displacement vector of the center of gravity in each image.

11.   The method of Claim 9, comprising the step of tracking from image to image in said time sequence of images the location of the center of gravity of clusters outside the contour of the lumen and determining a displacement vector of the center of gravity in each image.

12.   The method of any one of Claims 1 to 11, comprising the step of calculating for each image after said first image, motion density outside the contour of the lumen and motion density within the lumen.

13.   The method of Claim 12, comprising the step of discarding images having a motion density outside the contour of the lumen which exceeds a pre-defined threshold and discarding image(s) having a motion density within the lumen which does not exceed a pre-defined threshold.

14.   The method of Claim 12 or 13, comprising the step of identifying subsequences of images having simultaneously a low motion density outside the contour and a high motion density within the contour.

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15.   The method of Claim 10 or 11, comprising the step of determining in each image an angular difference or magnitude ratio between the displacement vector outside the lumen and the displacement vector within the uterus, and identifying images in which said angular difference or magnitude ratio has a value exceeding a predetermined threshold.

16.   The method of any one of Claims 1 to 15, comprising the step of displaying one or more parameters indicative of motion.

17.   The method of Claim 16, wherein said parameter is selected from motion density, displacement vector, shift, rotation, velocity.

18.   The method of any one of Claims 1 to 17, wherein said fetus or region thereof comprise the entire area within the lumen, the entire fetus, or a limb or organ of the fetus.

19.   A system for measuring motion of a fetus or of a region of a fetus within an uterus, the system comprising

    (a)   imaging device for obtaining a time sequence of images, each image including said fetus or region thereof and at least a portion of the uterus, the uterus comprising a lumen;

    (b)   a processing utility for processing said time sequence of images so as to obtain at least one first parameter indicative of movement of the fetus or region thereof and at least one second parameter indicative of movement of at least a portion of the uterus;

    (c)   display utility for displaying said at least one first and said at least one second parameter.

20.   The system of Claim 19, wherein said processing utility comprises means for determining whether the difference between the first parameter and the second parameter exceeds a predetermined value, a difference exceeding the predetermined value being indicative of motion of the fetus or region thereof relative to motion of the at least portion of the uterus.

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21.   The system of Claim 19 or 20, comprising means for marking in an image a contour of the lumen of the uterus in the image.

22.   The system of Claim 21, wherein said processing utility comprises a tracking utility for tracking the contour of the lumen from image to image.

23.   The system of Claim 21, wherein said processing utility comprises means for determining movement outside the contour of the lumen and movement within the lumen.

24.   The system of Claim 23, wherein said processing utility comprises means for detecting in each image after a first image in the time sequence of images, clusters of pixels displaying a change in brightness in comparison to brightness of a corresponding pixel in a previous image.

25.   The system of Claim 24, wherein said processing utility comprises means for distinctively marking clusters located within the contour of the lumen and clusters located outside the contour of the lumen.

26.   The system of Claim 25, wherein said processing utility comprises means for determining a center of gravity of clusters within the contour of the lumen and a center of gravity of clusters outside the contour of the lumen, wherein for each image in the sequence of images, said center of gravity of clusters within the contour of the lumen and a center of gravity of clusters outside the contour of the lumen form a pair of centers of gravity.

27.   The system of Claim 26, wherein said processing utility comprises means for tracking from image to image in said time sequence of images the location of the center of gravity of clusters within the contour of the lumen and determining a displacement vector of the center of gravity in each image.

28.   The system of Claim 26, wherein said processing utility comprises means for tracking from image to image in said time sequence of images the location of the center of gravity of clusters outside the contour of the lumen and determining a displacement vector of the center of gravity in each image.

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29. The system of any one of Claims 19 to 28, wherein said processing utility comprises means for calculating for each image after said first image, motion density outside the contour of the lumen and motion density within the lumen.

30. The system of Claim 29, wherein said processing utility comprises means for discarding images having a motion density outside the contour of the lumen which exceeds a pre-defined threshold and discarding images having a motion density within the lumen which does not exceed a pre-defined threshold.

31. The system of Claim 29 or 30, wherein said processing utility comprises means for identifying subsequences of images having simultaneously a low motion density outside the contour and a high motion density within the contour.

32. The system of Claim 31, wherein said processing utility comprises means for determining in each image an angular difference or magnitude ratio between the displacement vector outside the lumen and the displacement vector within the uterus, and identifying images in which said angular difference or magnitude ratio has a value exceeding a predetermined threshold.

33. The system of any one of Claims 19 to 32, comprising a display utility for receiving from the processing utility one or more parameters indicative of motion and displaying the same.

34. The system of any one of Claims 19 to 32, comprising an output utility for receiving from the processing utility one or more parameters indicative of motion and outputting the same.

35. The system of any one of Claims 19 to 34, comprising a user input interface.

36. The system of any one of Claims 19 to 35, comprising a storage utility for receiving and storing the time sequence of images recorded by said imaging device and for recording one or more parameters determined by said processing utility.

37. A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for measuring motion of a fetus or of a region of a fetus within an uterus in a time

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sequence of images, each image including said fetus or region thereof and at least a portion of the uterus, the uterus comprising a lumen, the method steps being defined by any one of Claims 1 to 18.

38. A computer program product comprising a computer useable medium having computer readable program code embodied therein for measuring motion of a fetus or of a region of a fetus within an uterus in a time sequence of images, each image including said fetus or region thereof and at least a portion of the uterus, the uterus comprising a lumen, the computer program product comprising:

computer readable program code for causing the computer to determine a first parameter indicative of movement of the fetus or region thereof;

computer readable program code for causing the computer to determine a second parameter indicative of movement of at least a portion of the uterus; and

computer readable program code for causing the computer to determine whether the difference between the first parameter and second parameter exceeds a predetermined value, a difference exceeding the predetermined value being indicative of motion of the fetus or region thereof relative to motion of the at least portion of the uterus.